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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/631,848	08/01/2003	Ju-Seon Goo	9862-000014/US	1042

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EXAMINER

EVERHART, CARIDAD

ART UNIT PAPER NUMBER

2891

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/631,848	<b>Applicant(s)</b> GOO ET AL.	
	<b>Examiner</b> Caridad M. Everhart	<b>Art Unit</b> 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 34 and 35 is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 10-16, 21-27, 29, 30, 36-39, 41-46 and 48-51 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8, 9, 17-20, 28, 31-33, 35, 40 and 47 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8-1-2003</u> . | 6) <input type="checkbox"/> Other: ____.  |

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4,7,10-16,21-27,29,30,36-39,41-46,48-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kajjura, et al. (US 5,907,382) in view of Shibuya, et al. (US 5,614,271).

Kajjura, et al disclose forming a polysilazane layer(col.13, lines 37-40). The layer is spin coated(col. 13, lines 53-55), and the layer is oxidized by exposing to ozone or by dipping in hydrogen peroxide(col. 13, lines 59-65).

Kajjura, et al is silent with respect to a semiconductor substrate and with respect to the baking step and oxygen or water as the oxidant nor the recited concentrations nor the recited structures.

Shibuya, et al disclose a silicon wafer (abstract). Polysilazane is coated on the wafer(col. 3, lines 46-50 and 63-67)) and oxidized using ozone.

Shibuya, et al teaches forming a spin on coating of polysilazane dissolved in a solvent such as toluene(col. 4,lines 15-20 and 27-30 discloses a solution) on a semiconductor substrate(abstract and col. 4,lines 28-32). The layer is then treated with ozone in order to convert the layer to oxide(col. 4, lines 50-64). The layer is first heated to a temperature below 400 degrees C(col. 4,lines 35-40) before the oxidation step. There is a hard bake at a temperature range which includes the recited temperature(col. 4,lines 65-68), so that the results recited with respect to etch resistance would be expected to be present. Shibuya, et al further discloses that the substrate can include circuit wiring of metal such as aluminum and in a circuit the metal would have been in a pattern as circuit wiring is in a pattern(col. 3,lines 49-55). Shibuya, et al further teaches oxygen and water vapor as the oxidant(col. 6, lines 42-46).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the method taught by Kaijura et al of coating and oxidizing a substrate with the teaching of Shibuya et al for a silicon wafer because the dipping method taught by Kaijura et al is another method for oxidizing the layer in addition to the ozone treatment, which is taught by both Kaijura et al and Shibuya, et al .

It would have been obvious to one of ordinary skill in the art at the time of the invention to have combined the heating step taught by Shibuya,et al with the process taught by Kaijura, et al because Shibuya, et al teach that this results in a denser coating(col. 5, lines 8-15), which would be desirable.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used oxygen and water vapor as taught by Shibuya et al in the method taught by Kaijura, et al because Shibuya et al teach that either oxygen plasma(col. 6, lines 26-29), which includes ozone such as Kaijura et al uses as discussed above, or oxygen and water can be used as the oxidant in the oxidizing of polysilazane.

It would have been obvious to one of ordinary skill in the art at the time of the invention that the method disclosed by Kaijura, et al could be combined with the semiconductor structures taught by Shibuya, et al because Shibuya, et al teach that the oxidized polysilazane is a useful dielectric layer in semiconductor circuit structures. With respect to the recited metals, these are conventional in the art as contact structures with aluminum metallization, which is taught by Shibuya et al, and as substitutes for aluminum metallization, so that it would have been obvious to one of

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ordinary skill in the art at the time of the invention to have used the recited materials.

With respect to the proportions of the solvents recited, this is a variable of the art which one of ordinary skill in the art would have been able to determine and therefore would have been obvious to one of ordinary skill in the art at the time of the invention because they are variables of the art.

***Allowable Subject Matter***

Claims 34-35 allowed.

Claims 5,6,8,9,17-20,28,31-33,,35,40,47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Everhart  
6-6-2005

*C. Everhart*  
CARIDAD EVERHART  
PRIMARY EXAMINER